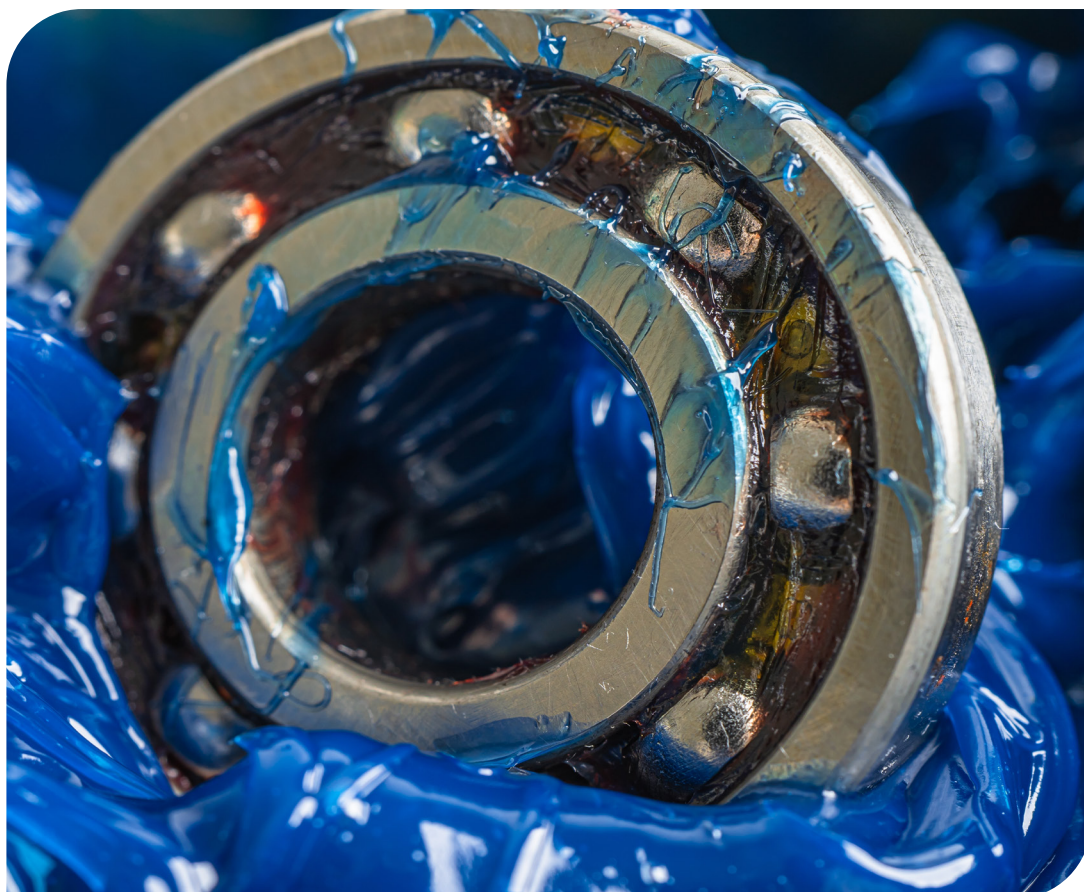


# Speciality greases



High quality components  
to formulate high  
performance greases

**Cargill**<sup>®</sup>



## Speciality greases

There are many industries and applications where high quality grease may be required, including automotive, industrial, marine, mining and agriculture. Naturally, the choice of product will depend on a variety of technical requirements relevant to the end application. We are a major global supplier of high performance synthetic ester and polyalkylene glycol base oils, viscosifiers and soap production additives into grease applications. Our broad product range and application experience allows us to work effectively in partnership with our customers in the grease industry.

## Lubricating base oils

The base fluid component of grease must be able to perform many functions. For example, the grease is required to have excellent lubricating properties and good solubility characteristics, enabling it to solubilize performance enhancing additives. The base oil should be matched to the thickener system to avoid detrimental effects through solubilization. A lubricating base fluid may also be required to have the following attributes:

### Highly biodegradable/renewable

Biodegradability and renewability are considered to be vital formulation attributes in the selection of the right product for a given application, particularly as new and changing environmental standards come into effect. By utilizing more renewable raw materials, industry can reduce its dependence on petrochemical derived materials, thus reducing the impact on the environment.

### Able to withstand extreme temperatures

In extreme high temperature applications the base oil must be able to tolerate long periods of operation without any significant loss of performance. For low temperature applications the base oil must be tolerant to operating and storage at very low temperatures without crystallizing and/or freezing.

### Suitable to meet food contact criteria

The food industry requires lubricants that offer enhanced performance, reliability and extended life. Food grade approval from one of the recognized regulatory bodies will also be a pre-requisite for this industry:

- Food and Drug Administration (FDA)
- National Sanitation Foundation (NSF) HX-1

## Speciality base oils

Our ester and polyalkylene glycol base oils, under the Priolube™ and Emkarox™ brands respectively, have been developed with the modern demands of greases in mind. With a wide range of viscosities, and products that meet speciality requirements such as extreme temperature stability and food contact approval, we offer the formulator flexibility with their base oil selection.

Product name	Kinematic viscosity at 40°C (mm <sup>2</sup> /s)	Kinematic viscosity at 100°C (mm <sup>2</sup> /s)	Viscosity index	Pour point (°C)	Flash point COC (°C)	Suitable for high temperature applications
Priolube 3958	10.5	3	146	-78	215	-
Priolube 3966	12.2	3.3	148	-78	235	-
Priolube 1856	12.5	3.3	140	-78	230	-
Priolube 1935	14.5	3.7	149	-72	226	-
Priolube 1937	19	4.1	120	-40	240	●
Priolube 3970	20	4.4	140	-51	250	-
Priolube 1428	22	5	160	-15	250	-
Priolube 1936	26	5.3	139	-54	244	●
Priolube 1843	35	7.5	193	-42	295	-
Priolube 2089	44	8.7	181	-54	315	-
Priolube 1973	46	8	148	-44	280	●
Priolube 1427	48	9.5	187	-39	300	-
Priolube 2065	48	9.8	196	-39	300	-
Priolube 1941	52	8	124	-45	282	●
Priolube 1426	65	13	208	-27	310	-
Priolube 1942	71	9.6	116	-48	273	●
Priolube 2500	90	13	143	-24	280	-
Priolube 3999	90	14	144	-27	290	-
Priolube 1940	91	9.6	78	-36	261	●
Emkarox VG 96	92	17	201	-42	230	-
Priolube 1943	97	11	100	-39	275	●
Priolube 1968	100	13	127	5	300	-
Emkarox VG 126	125	23	204	-36	225	-
Priolube 1938	143	13.1	83	-30	280	●
Emkarox VG 146	145	25	207	-45	224	-
Priolube 3987	145	18.2	140	-33	320	-
Priolube 1889	170	17	107	-29	302	●
Emkarox VG 180	180	30	211	-36	225	-
Emkarox VG 222	221	38	215	-36	225	-
Priolube 1939	306	20.2	73	-9	276	●
Priolube 2087	320	35	150	-40	260	●
Priolube 2088	320	35	150	-40	260	-
Emkarox VG 380	380	61	234	-33	230	-
Priolube 2046	400	40	163	-36	310	●
Emkarox VG 444	447	72	242	-36	228	-
Emkarox VG 462	460	75	244	-27	230	-
Priolube 1851	495	49	153	-36	300	-

\*1>100mg/l was the highest reported concentration at the time of testing

<sup>2</sup>In compliance with 21CFR regulation (178.3570: lubricants for indirect food contact)

Noack weight loss at 250°C/1hr (%)	10% Oxidative induction time at 140°C (min)	Iodine value (g I <sub>2</sub> /100g)	Non-polarity index	Biodegradability OECD 301B (%)	Renewability (%)	Incidental food contact approved
18.1	197	0.5	52	81.3	<60	-
-	247	0.5	55	84.6	<60	NSF-HX-1
16.3	244	0.4	55	84.6	<60	FDA <sup>2</sup>
14.2	87	0.6	55	64	0	-
4.8	1,534	0	38	-	0	-
3.0	266	0.5	60	75	81	NSF-HX-1
4.4	16	88	118	>60	86	-
5.8	78	0.3	82	74	0	-
1.6	19	74	95	>60	-	-
1.1	18	72	171	84	92	-
1.7	181	2	136	85	87	-
1.3	19	84	189	79	90	-
1.2	28	84	196	79	90	NSF-HX-1
1.4	1,445	0.5	71	-	0	-
1.6	19	84	184	64	85	-
1.4	195	0.7	82	-	0	-
-	-	3	196	75	>80	NSF-HX-1
1.7	38	50	195	65	87	NSF-HX-1
2.0	1,561	0.6	60	-	0	-
-	71	-	-	-	-	-
1.5	148	0.6	59	-	0	-
1.3	68	45	196	>60	86	-
-	-	-	-	-	-	FDA <sup>2</sup>
1.2	104	0.2	82	-	0	-
-	58	-	-	-	-	-
0.9	89	3	231	70	95	-
<1	1,366	0.5	107	-	<60	-
-	-	-	-	-	-	FDA <sup>2</sup>
-	56	-	-	-	-	FDA <sup>2</sup>
1.5	59	0.5	98	-	0	-
1.9	53	30	188	63	88	-
-	78	30	188	62.9	88	NSF-HX-1
-	22	-	-	-	-	FDA <sup>2</sup>
1.1	251	20	200	<20	85	-
-	-	-	-	-	-	FDA <sup>2</sup>
-	-	-	-	-	-	-
0.5	101	3	210	65	95	-

## Base oil viscosifiers

Our base oil viscosifiers are high viscosity ester products, and can be used to tailor the base oil viscosity for the intended application.

Product name	Kinematic viscosity at 40°C (mm <sup>2</sup> /s)	Kinematic viscosity at 100°C (mm <sup>2</sup> /s)	Viscosity index	Biodegradability (%)	Renewability (%)	10% Oxidative induction time at 140°C (min)
Priolube 1847	1,040	90	167	63	81	110.5
Priolube 1929	1,700	125	175	<20	80	297.3
Priolube 3986	47,000	2,000	278	-	85	87.3
Priolube 3997	40,000	2,000	290	-	82	-

## Base oil additives

Enhancing performance and extending product life requires the efficient use of high performance additives. We offer products compatible with normal processing and operating conditions. This range is compatible with a wide range of base oils, and supports the demanding requirements for corrosion inhibition and friction control at low dosage rates.

### CORROSION INHIBITOR

Perfad 9013 is an oil soluble corrosion inhibitor, suitable for use in a wide range of applications, particularly in greases.

Product name	Treat rate (% w/w)	Thickener	Water (5% w/w)	EMCOR bearing corrosion test rating - steel (IP 220)
Perfad 9013	0.2	Lithium Soap/Complex	Distilled	0
	1.5	Lithium Soap/Complex	Seawater	0
	2.0	Polyurea	Seawater	2

### FRICTION MODIFIER

Perfad 3100 is a high performance friction modifier with high oxidative and thermal stability, ideal for use in industrial applications. It is European Ecolabel compliant and is featured on the LuSC list.

Product name	Iodine value (g I <sub>2</sub> /100g)	Phosphorus (%)	Sulphur (%)	Ash (%)
Perfad 3100	1	0	0	0.02

## Soap production additives

It is the thickener that creates the grease structure. An organic acid soap, created by the reaction of an alkaline earth metal hydroxide with a fatty acid, is often used.

Soaps are typically fibrous and will vary in thickness, length and oil solubility depending on the type of metal hydroxide used. These variations will be displayed in the final properties of the grease.

Our high quality fatty acids and azelaic acid cross-linkers are designed for use during soap production which can result in an improvement to the grease consistency, and support reduced oil consumption.

Product name	Chemistry	Acid value (mg KOH/g)	Saponification value (mg KOH/g)	Iodine value (g I <sub>2</sub> /100g)	Biodegradability OECD 301B (%)	Renewability (%)	Incidental food contact approved
Priolene 6907	Fatty acid	200	202	95	93	100	NSF-HX-1
Prisorine 3501	Fatty acid	187	195	5	87	100	FDA <sup>1</sup>
Prisorine 3505	Fatty acid	190	197	2	-	-	-
Priacid A75	Azelaic acid	570-595	602	1.8	72 <sup>1</sup>	66	FDA <sup>2</sup>
Priacid A95	Azelaic acid	575-595	599	<0.1	72 <sup>1</sup>	66	FDA <sup>2</sup>

<sup>1</sup>In compliance with 21CFR regulation (178.3570: lubricants for indirect food contact)





## Who are we?

The Energy Technologies business in Cargill Bioindustrial creates, makes and sells speciality chemicals and additives for the global energy market. Working in close collaboration with our customers, we apply sustainable concepts and deep scientific expertise so that together we can efficiently power the world of tomorrow.

At our core, we are experts in synthetic ester and polyalkylene glycol chemistries, taking products from lab scale through to full manufacturing. Investing in the development of new chemistries allows us to support our customers in meeting new industry challenges.

For those who dare to imagine a brighter future, we establish long lasting relationships and create bespoke industry solutions through our integrated research & development and global manufacturing capabilities. Being both global and local, you have direct access to our network of technical experts. We look forward to talking to you.

## Further information

Cargill Bioindustrial sales and distribution are coordinated through an extensive worldwide network of technical and commercial experts. For further information or guidance please contact us:

**[energy\\_technologies@cargill.com](mailto:energy_technologies@cargill.com)**

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